AD-A264 678

MENTATION PAGE

Form Approved
OMB No 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
		FINAL/01 JUN 91 TO 31 MAR 93

(2)

4. TITLE AND SUBTITLE
EFFICIENT ALGORITHMS AND DATA STRUCTURES IN GEOMETRIC DESIGN

5. FUNDING NUMBERS
AFOSR-91-0276
61102F 2304/DS

6. AUTHOR(S)
DR. CHANDRAJIT L. BAJAJ

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
UNIVERSITY OF TENNESSEE
404 ANDY HOLT TOWER
KNOXVILLE TN 37996-0140

8. PERFORMING ORGANIZATION REPORT NUMBER
AFOSR-TR- 93 0528

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
AFOSR/NM
110 DUNCAN AVE, SUTE B115
BOLLING AFB DC 20332-0001

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
AFOSR-91-0276

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

Research has been conducted on the design of a numerically stable and topologically robust algorithm for boolean set operations between solids with algorithms surface patches of arbitrary degree.

93 5 20 009

93-11300

14. SUBJECT TERMS	15. NUMBER OF PAGES
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	SAR(SAME AS REPORT)

Final Technical Report
Efficient Algorithms and Data Structures in Geometric Design
June 1, 1991 - March 31, 1993

Chandrajit L. Bajaj
Computer Science Department,
Purdue University,
West Lafayette, Indiana 47907
bajaj@cs.purdue.edu, 317-494-6531

AFOSR contract 91-0276

1 Publications in Reviewed Journals

1. "Algebraic Surface Design with Hermite Interpolation", (with I. Ihm), *ACM Transactions on Graphics*, 19, 1, (1992), 61-91.
2. "Convex Decompositions of Polyhedra and Robustness", (with T. Dey), *Siam Journal on Computing*, 21, 2, (1992), 339-364.
3. "Factoring Rational Polynomials over the Complexes", (with J. Canny, T. Garrity, J. Warren), Accepted for Publication in *Siam Journal on Computing*, (1992).
4. "On Good Triangulations in Three Dimensions", (with T. Dey, and K. Sugihara), *International Journal of Computational Geometry and Applications*, 2, 1, (1992), 75-95.
5. "Exact and Least Squares Approximate G^k Fitting of Implicit Algebraic Surfaces", (with I. Ihm, J. Warren), Accepted for Publication in *ACM Transactions on Graphics*, (1992).
6. "C^1 Smoothing of Polyhedra with Implicit Algebraic Splines", (with I. Ihm) *Computer Graphics*, 26, 2, (1992), 79 - 88.
7. "Robust Triangulations in Three Dimensions with Finite Precision Arithmetic", (with T. Dey, and K. Sugihara), *Computer Aided Geometric Design*, 9, (1992), 457 - 470.

2 Books and Book Chapters

1. "Surface Fitting with Implicit Algebraic Surface Patches", *Topics in Surface Modeling*, edited by H. Hagen, SIAM Publications, (1992), 23 - 52.
2. "Using Algebraic Geometry for Multivariate Hermite Interpolation", *Special Issue of Proceedings of Symposium to Honor Sam Conte*, West Lafayette, IN, (1992), in press.

3. "Some Applications of Constructive Algebraic Geometry", **Algebraic Geometry and Applications**, *Special Issue of Symposium on the occassion of Shreeram Abhyankar's 60th Birthday* edited by C. Bajaj, Springer Verlag, (1992), in press.

4. "The Emergence of Algebraic Curves and Surfaces in Geometric Design", *Directions in Geometric Computing 1991*, edited by R. Martin, Information Geometers Press, United Kingdom (1992), in press.

3 Graduates Students Supported

Two graduate students at 0.25 time for 1 semester: Christopher Wang, Jose Sotero.

4 Postdoctoral Associates Supported

One postdoctoral associate at 0.5 time for the year: Dr. Insung Ihm

5 External honors, including society awards, fellows of major societies, invited plenary addresses etc.

1. Program Committee Member, Seventh Annual ACM Symposium on Computational Geometry, New Hampshire, 1991.
2. Invited Keynote Speaker, I.CO. GRAPHICS'91 Conference in Milan, Italy, February 1991.
3. Invited Speaker, Special Year on Symbolic Computation at the Nankai Institute of Mathematics, Tianjin, China, April 1991.
4. Invited Speaker, Dagstuhl-Seminar on Algorithmic Geometry, Saarbrucken, West Germany, October 1991.
5. Invited Speaker, Curves and Surfaces in Computer Vision and Graphics II, SPIE Conference, Boston, MA, November 1991.
6. External Ph.D. Examiner, Department of Computer Science, University of Waterloo, Canada, December 1991.
7. Invited Speaker, 10th Army Mathematics Conference, West Point, N. Y., June 1992.
8. Invited Panel Member,"Toward Multimedia Computing" in the International Conference on Software and Knowledge Engineering, Capri, Italy, June 1992.
9. Invited Speaker, International Workshop on Mathematics Mechanization, Institute of System Sciences, Beijing, China, July 1992.
10. Invited Speaker, International Workshop on Algebraic Approaches to Geometric Reasoning, RISC-LINZ, Austria, August 1992.
11. Distributed and Collaborative Geometric Design, Colloquium Presentation, University of Iowa, Iowa, (October 1992).

12. B-spline Approximations of Algebraic Curves and Surfaces, Presentation at the Conference on Advances in Computational Mathematics, New Delhi, India (December 1992).

13. Shape Optimization in a Distributed and Collaborative Design Environment, Invited Presentation, AFOSR Workshop on Large Scale Optimization, Ames, Iowa (January 1993).

14. A-Spline: Algorithms and Combinatorics, Colloquium Presentation, New York University, (February 1993).